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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,747	12/09/2003	Kazuhiro Tamura	ELPIDA 02USFP796 DIV	4303
27667	7590	11/03/2004		
HAYES, SOLOWAY P.C. 130 W. CUSHING STREET TUCSON, AZ 85701			EXAMINER THOMAS, TONIAE M	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/731,747

Applicant(s)

TAMURA, KAZUHIRO

Examiner

Toniae M. Thomas

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) 18-20,23,24 and 26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-17,21,22 and 25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 10/260,484.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>04/01/04; 05/10/04</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

1. This office action is a first Office action on the merits of Application Serial No. 10/731,747, filed on 09 December 2003, which is a divisional of co-pending Application Serial No. 10/260,484, filed on 30 September 2002.
2. The preliminary amendment filed on 09 December 2003 cancelled claims 1-13. Currently, claims 14-26 are pending.

***Election/Restrictions***

3. This application contains claims directed to the following patentably distinct species of the claimed invention:

- I. the embodiment of fig. 2 (claims 14-17, 21-22, 25); and
- II. the embodiment of fig. 4 (claims 18-20, 23-24, 26).

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic.

4. Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

5. Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as

provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

6. Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

7. During a telephone conversation with Norman Soloway (Reg. No. 24,315) on 25 October 2004 a provisional election was made without traverse to prosecute the invention of Group I, claims 14-17, 21-22, and 25. Affirmation of this election must be made by applicant in replying to this Office action. Claims 18-20, 23-24, and 26 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Specification***

8. The disclosure is objected to because the specification contains a statement that is inconsistent with the rest of the specification. In the *Summary of the Invention*, at page 7 and lines 6-8, it states that the insulating film formed on the silicon oxide film exerts a compressive stress on the silicon substrate; whereas everywhere else in the specification, the insulating film exerts a tensile stress on the silicon substrate (see page 3, lines 19-24; page 4, lines 9-16; and page 10, lines 1-9). Thus, the statement at page 7 and lines 6-

8 is inconsistent with the rest of the specification. Appropriate correction is required.

9. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). While the specification provides support for forming the insulating film of either silicon nitride or silicon oxynitride (page 3, lines 25-27; page 5, lines 9-11 and 22-24; page 8, lines 6-8 and 22-24; page 10, lines 5-10; and page 14, lines 1-8), it does not provide support for forming the insulating film of silicon oxide, as recited in claims 17 and 22. Correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 21-22 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for forming an insulating film on the silicon oxide film, wherein the insulating film exerts a tensile stress on the silicon substrate, does not reasonably provide enablement for forming an insulating film on the silicon oxide film such that the insulating film exerts a compressive stress on the silicon substrate, as recited in claim 21 at lines 4-5. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention

commensurate in scope with these claims. In the specification, at page 10 and lines 5-10, it clearly states that the insulating film, which has a compressive internal stress, exerts a tensile stress on the substrate and, thereby, relaxes the internal stress of the substrate.

11. For purposes of examination, the claim language recited in claim 21 at lines 4-5 is interpreted in light of the specification - i.e. the insulating film exerts a tensile stress on the substrate.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. *Claims 14-17, 21-22, and 25 are rejected under 35 U.S.C. 102(e) as being anticipated by Lin et al. (US 2002/0022340 A1).*

Regarding claims 14-17

The Lin et al. pre-grant published application (Lin) discloses a method for fabricating a semiconductor device (figs. 3A-3F and accompanying text). The method comprises the following steps as recited in claim 14: forming a trench 50 for isolation in a semiconductor substrate 100 (fig. 3B and par. 20)); and

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forming an insulating film 43 to cover the trench for relaxing an internal stress of the silicon substrate (fig. 3C and par. 21 and 25). The insulating film includes a first portion opposed to the bottom of the trench, and a second portion opposed to a side of the trench (fig. 3C), wherein a thickness of the first portion of the insulating film is different from a thickness of the second portion of the insulating film, as recited in claim 14 (fig. 3F).

Second portion

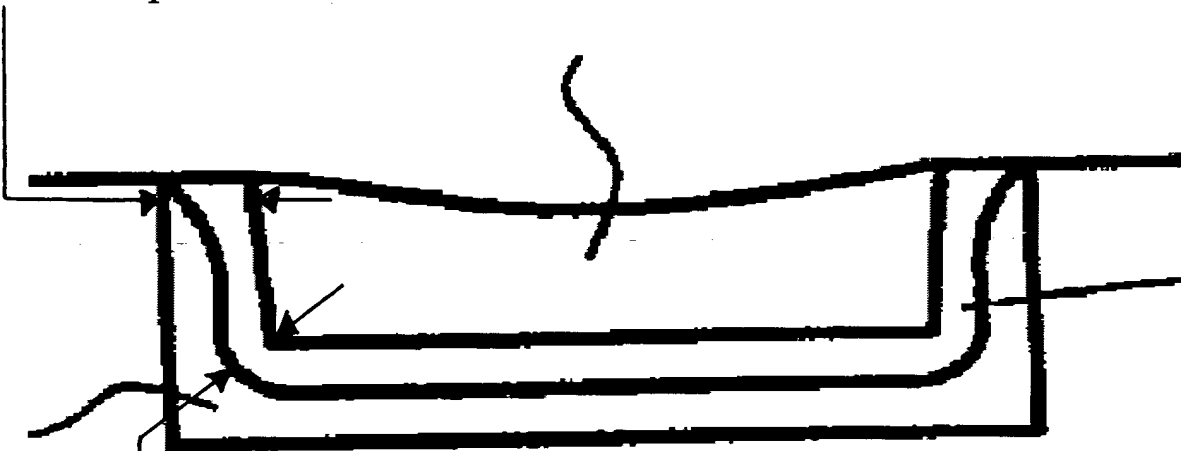


FIG. 3F

First portion

Figure 3F clearly shows that a thickness of the first portion of the insulating film 43 opposed to the bottom of the trench is thinner than a thickness of the second portion of the insulating film opposed to the sides of the trench, as recited in claim 15.

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insulating film exerts a tensile stress on the substrate, as recited in claim 16 (fig. 3C and par. 21 and 25).

The insulating film 43 is formed of one selected from the group consisting of silicon oxide and silicon oxynitride, as recited in claim 17 (par. 21)

Regarding claims 21, 22, and 25

Lin discloses a method for fabricating a semiconductor device, the method comprising the following steps as recited in claims 21 and 25: forming a trench 50 for isolation in a semiconductor substrate 100 (fig. 3B and par. 20); forming a silicon oxide film 42 to cover the trench (fig. 3C and par. 21); and forming an insulating film 43 on the silicon oxide film, wherein the insulating film includes a first portion opposed to the bottom of the trench, and a second portion opposed to a side of the trench (fig. 3C and par. 21).

As discussed above with respect to claim 15, figure 3F clearly shows that a thickness of the first portion of the insulating film opposed to the bottom of the trench is thinner than a thickness of the second portion of the insulating film opposed to a side of the trench, as recited in claim 21.

A thickness of the first portion of the insulating film is different from a thickness of the second portion of the insulating film, as recited in claim 25 (fig. 3F).

The insulating film 43 is formed of one selected from the group consisting of silicon oxide and silicon oxynitride, as recited in claim 22 (par. 21).



The insulating film is formed of one selected from the group consisting of silicon nitride and silicon oxynitride, as recited in claim 25 ().


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday-Thursday from 8:30 a.m. to 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMJ

31 October 2004

  
Mary Wilczewski  
Primary Examiner